



Research Paper

Production and export of groundnut from India - An overview

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ABSTRACT : The peanut, groundnut pea, or groundnut (*Arachis hypogaea*) is a native of South America but was early carried to the old world tropics by the Portuguese explorers. Groundnut is the major oilseed of India. India occupies the top position in the world with regard to acreage and production of groundnut which are 5-6 million hectares but the production has increased from 6.41 million tons to 7.54 million tons with the increased productivity levels. Groundnut exports from India are mostly to Indonesia, UK, Malaysia, Philippines, Sri Lanka and Singapore. Among these countries, Indonesia, Malaysia and Singapore are the major buyers for Indian ground nut. It is worth noting that the growth rates in export of groundnut increasing over a period on one hand and export competitive on the other. The quantity of groundnut exports grew annually by 15.25 per cent, export value by 24.28 per cent and unit value by 4.09 per cent. Thus, country has a comparative advantage in the export of groundnut and this can be achieved with the concerted efforts of government by developing transport facilities to export the groundnut.

KEY WORDS : Groundnut, Production, Export, Growth rate, Trade

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INTRODUCTION

Groundnut is the one of the world's important oilseed crops. Its seeds are rich sources of edible oil (43-55%) and protein (25-28%). China and India are the major producers of groundnut followed by Sub-Saharan African countries and central South America.

Groundnut is the major oilseed crop of India. India occupies the top position in the world with regard to acreage and production of groundnut which are 5-6 million acres and 4-5 million tons, respectively. The states of India *i.e.* Gujarat, Maharashtra, Andhra Pradesh, Karnataka and Tamil Nadu account for about 90 per cent of groundnut producing area. Gujarat accounts for around 25 per cent of the oilseed production of the country. Production is highly vulnerable to rainfall deviation and display huge fluctuation between years.

India exports groundnut to more than 75 countries including Indonesia, Malaysia, UAE, Gulf, Srilanka, Philippines,

Canada, UK and EU countries. India's groundnut exports during the current year is likely to touch around 4 lakh tons. Government estimated 7.54 million lakh tons of groundnut production in India for the year 2010-11, which was 5.43 million tons in 2009-10. Gujarat is the largest groundnut producing state in the country with production of 1.76 million tons in 2009-10. Last year, Gujarat produced 2.66 million tons of groundnut.

The peanut, groundnut pea, or groundnut (*Arachis hypogaea*) is a native of South America but was early carried to the old world tropics by the Portuguese explorers. The chief groundnut growing regions are India, China, East and West Africa, U.S.A., and France. The nuts or seeds are used for roasting or salting in candy and for the preparation of peanut butter. Composition of 100 edible portion of peanut include protein (26 g), fat (47.5g), carbohydrate (18.5 g), fibre (2.4 g) and water (5.6 g).Peanut oil is an important food oil. The oil cake is fed to livestock.

With this background in the present paper an effort has been made to study the export of groundnut from India with the following objectives to study the area, production, productivity and export of groundnut and to assess the share of export in production of groundnut.

MATERIALS AND METHODS

The study utilizes the secondary data gathered from the various publications and web sites of APEDA and directorate of statistics and economics. The data gathered pertained to area, production, yield, export quantity, export value and export unit value of groundnut for the 11 years that is from 2000-01 to 2010-11. Percentage, mean were computed wherever necessary for the above variables.

To study the annual growth rate of area, production, productivity, export quantity and value of export of ground nut, the compound growth rate was computed using semi log or exponential model (Gujarati, 1995).

$$\ln y_t = a + \beta_1 t + u_t$$

where

Y_t = Quantity (tons) of groundnut exported in year t.

t = Time element which takes the value 1, 2 n for various years.

a_i = Intercept

β_1 = Regression co-efficient

Annual compound growth rate (r) = [(Antilog^st)-1] x100]

Markov chain analysis :

Annual export data for period 2000-01 to 2010-11 were used to analyze the direction of trade and changing pattern of Indian groundnut. The major groundnut importing countries considered were Malaysia, Indonesia, UK, Philippines and Singapore. Estimation of the exports was done for the study period using Markov chain analysis.

Markov chain analysis was employed to analyze the structural change in any system whose progress through time can be measured in terms of single outcome variable (Dent, 1967). In the present study, the dynamic nature of trade patterns that is the gains and losses in export of groundnut in major importing countries was examined using the Markov chain model. Markov chain analysis involves developing a transitional probability matrix 'P', whose elements, P_{ij} indicate the probability of exports switching from country 'i' to country 'j' over time. The diagonal element P_{ij} where $i=j$, measures the probability of a country retaining its market share or in other words, the loyalty of an importing country to a particular country's exports.

In the context of current application, structural change was treated as a random process with six importing countries for groundnut the assumption was that the average export of

groundnut from India amongst importing countries in any period depends only on the export in the previous period and this dependence was same among all the periods. This was algebraically expressed as :

$$E_{jt} = \sum_{i=1}^n [E_{it-1}] P_{ij} + e_{jt}$$

where,

E_{jt} = exports from India to the j^{th} country in the year t

E_{it-1} = exports of i^{th} country during the year t-1

P_{ij} = the probability that exports will shift from i^{th} country to j^{th} country

e_{jt} = the error term which is statistically independent of E_{it-1}

n = the number of importing countries.

The transitional probabilities P_{ij} , which can be arranged in a (c x n) matrix, have the following properties.

$$\sum_{i=1}^n P_{ij} = 1 \quad \text{And} \quad 0 \leq P_{ij} \leq 1$$

Thus, the expected export share of each country during period 't' is obtained by multiplying the exports to these countries in the previous period (t-1) with the transitional probability matrix. The probability matrix was estimated for the period 2000-01 to 2010-11.

Thus transitional probability matrix (T) was estimated using linear programming (LP) framework by a method referred to as minimization of Mean Absolute Deviation (MAD).

$$\text{Min, } OP^* + Ie$$

Subject to

$$XP^* + V = Y$$

$$GP^* = 1$$

$$P^* \geq 0$$

where,

P^* is a vector of the probabilities P_{ij}

O is the vector of zeros

I is an appropriately dimensional vectors of areas

e is the vector of absolute errors

Y is the proportion of exports to each country.

X is a block diagonal matrix of lagged values of Y

V is the vector of errors

G is a grouping matrix to add the row elements of P arranged in P^* to unity.

Prediction of quantity of Ground nut export ware made by using the Transitional Probability Matrix.

$$B_t = B_0 * T$$

$$B_{t+i} = B_{t+i-1} * T$$

where,

B_0 = Quantity exported in Base years

B_t = Quantity exported in next year (prediction)

T = Transitional probability matrix.

RESULTS AND DATA ANALYSIS

The findings of the present study as well as relevant discussion have been presented under following heads :

Groundnut is being mainly cultivated in Gujarat, Andhra Pradesh, Tamil Nadu, Karnataka, Maharashtra, Rajasthan, Madhya Pradesh, Orissa, Uttar Pradesh states of India. State wise area, production and productivity of Ground nut during 2009-10 are presented in Table 1. It is being cultivated in an area of about 5.48 million hectares with a production of about 5.43 million tones in India. The national average productivity was 991kgs per ha. Among states Tamil Nadu, Maharashtra, Rajasthan Madhya Pradesh, Orissa are above national average productivity and rest of the states had below national average productivity. The share of Gujarat, Andhra Pradesh, Karnataka states in the total groundnut area of the nation was 72 per cent contributing 60 per cent to the total production of groundnut in the country. The contribution of rest of the states towards groundnut production of the country was only about 40 per cent. Among the major groundnut growing Indian states, Gujarat is the leading state in the country as its share in the total area was to the extent of 33.26 per cent contributing 32.37 per cent of the nation's groundnut production.

Temporal variation in area production and productivity :

Over the years, the groundnut is being cultivated in an area of five to six million hectares but the production has increased from 7.03 million tons to 7.54 million tons with the increased productivity levels during 2000-01 to 2010-11. There was spurt in the area, production and productivity of groundnut especially in the year 2002-03. The area under groundnut has declined continuously after 2002-03 to 2006-07 and at the same time there was decrease in the productivity except during the year 2003-04 and 2005-06. Looking to the data it is apparent that the increase in groundnut production is due to increase in

the productivity than the increase in area (Table 2).

The cardinal factors driving this significant increase in production are the use of high yielding hybrids in place of varieties, increase in average yield, favorable weather conditions. Better crop management practices and higher yield levels led to bumper crop harvest during 2004-05 and 2005-06 resulting in a sharp fall in prices during that period. Due to unattractive prices, most of the farmers shifted their production to other cash crops like cotton, sugarcane, etc., and thus resulting in a decline in area and production under groundnut cultivation. The increased productivity may be attributed to advent of high yielding varieties and improved crop management practices.

Export of groundnut :

Groundnut exports from India are mostly to Indonesia, UK, Phillipines, and Singapore. Among these countries, Indonesia, UK and Singapore are the major buyers for Indian groundnut. It exports in different forms like groundnut powder, groundnut shelled, groundnut kernels, peanut splits, blanched peanut processed groundnut and groundnut oil. In most of the countries groundnut oil is used for cooking. India today faces stiff competition from China who offers their produce in International market at very competitive price. The details of quantity of groundnut exported from India over the years are presented in Table 4. It could be observed from Table 4 that the quantity of groundnut exported over the years rose from 1.3 lakh tons in 2000-01 to 4.1 lakh tons in 2010-11. The increase in export was in tune with increase in production as India is the major producer and consumer of groundnut. The export of groundnut in proportion to production was just 2.14 per cent in the year 2000-01 rose to 5.53 per cent in the year 2010-11, still there is a potential to increase its export. The point to be noted here is that the proportion of export increased especially after 2003-04. Similar work on export of groundnut was done by Chandrashekhar (2001); Diop *et al.* (2004) and Mamatha (1996).

Table 1: State-wise area, production and productivity of ground nut during 2009-10

State	Area (in million hectares)	Percentage to all India	Production (in million tons)	Percentage to all India	Yield kg/hectars
Gujarat	1.82	33.26	1.76	32.37	964
Andhra Pradesh	1.3	23.75	1.01	18.53	773
Tamil Nadu	0.41	7.54	0.89	16.39	2156
Karnataka	0.82	14.93	0.51	9.43	626
Maharashtra	0.32	5.86	0.36	6.61	1118
Rajasthan	0.33	5.95	0.35	6.53	1087
Madhya Pradesh	0.19	3.43	0.22	4.01	1158
Orissa	0.08	1.39	0.09	1.64	1169
Uttar Pradesh	0.09	1.66	0.06	1.12	670
Others	0.12	2.21	0.18	3.35	-
All India	5.48	100	5.43	100	991

Export quantity, value and unit value of groundnut :

The quantum of exports, export value and unit value has increased over the years (Table 4). From year to year there is a positive change in the quantity export, export value except in 2000-01 to 2001-02 and over the years there is a positive change in the unit value. In the year 2001-02 there was decline in the

quantity exported and obviously the export value though there was positive change in the unit value of export compared to the previous period (2000-01). The remarkable increase in export both in terms of quantity and value especially from 2002-03 onwards needs to be investigated. This may be partly due to changing economic environment and partly due to favorable

Table 2: Area, production and productivity of groundnut in India, 2000-01 to 2010-11

Year	Area (in million hectares)	Percentage change	Production (in million tons)	Percentage change	Productivity (kg/ha)	Percentage change
2000-01	6.56	-4.87	6.41	9.67	977	15.35
2001-02	6.24	4.81	7.03	41.39	1127	38
2002-03	5.94	-0.84	4.12	-97.33	694	-96
2003-04	5.99	-10.85	8.13	16.73	1357	25
2004-05	6.64	-1.51	6.77	-18.02	1020	-16
2005-06	6.74	16.62	7.99	39.17	1187	27
2006-07	5.62	-11.92	4.86	-88.89	866	-68
2007-08	6.29	1.99	9.18	21.92	1459	20
2008-09	6.16	11.15	7.17	24.27	1163	15
2009-10	5.48	-8.57	5.43	-38.87	991	-28
2010-11	5.95	29.49	7.54	25.42	1268	-6

Table 3 : Production and export of ground nut in India during 2000-01 to 2010-11

Year	Production (in million tons)	Exports (in metric tons)	Percentage of export to production
2000-01	6.41	137065.6	2.14
2001-02	7.03	112812.8	1.60
2002-03	4.12	67,850.74	1.65
2003-04	8.13	176109.3	2.17
2004-05	6.77	177154.1	2.62
2005-06	7.99	190053.3	2.38
2006-07	4.86	251428.7	5.17
2007-08	9.18	269587.6	2.94
2008-09	7.17	297890.4	4.16
2009-10	5.43	340246.3	6.27
2010-11	7.54	417150	5.53

Table 4 : Export quantity, value and unit value of ground nut from India, 2000-01 to 2010-11

Years	Export in quantity		Export values		Unit value(Rs./kg)
	In tons	Percentage change	Rs. (in lakh)	percentage change	
2000-01	137065.6	-17.6943	31,640.29	-20.6902	23.08404
2001-02	112812.8	-39.8555	25,093.84	-28.9849	22.24379
2002-03	67,850.74	159.554	17,820.42	205.4385	26.26415
2003-04	176109.3	0.593262	54,430.43	0.49961	30.90718
2004-05	177154.1	7.281355	54,702.37	-6.09405	30.87841
2005-06	190053.3	32.29374	51,368.78	55.43682	27.02861
2006-07	251428.7	7.222319	79,846.00	32.01386	31.75692
2007-08	269587.6	10.49853	105407.8	17.54439	39.09964
2008-09	297890.4	14.21863	123900.9	15.08653	41.5928
2009-10	340246.3	22.60236	142593.3	46.85571	41.90884
2010-11	417150	-100	209406.4	-100	50.1993

Table 5 : Growth rates of area, production, productivity and export from 2000-01 to 2010-11

Area	-0.87764 ^{NS}
Production	1.23 ^{NS}
Productivity	2.12 ^{NS}
Export	15.25**
Export value	24.28**
Unit value	4.09168 ^{NS}

NS=Non-significant

Table 6 : Transitional probability matrix of Indian Ground nut exports (2000-2010)

	Indonesia	UK	Philippines	Singapore	Malaysia	Others
Indonesia	0.7152	0.0237	0.0766	0.0203	0.0285	0.1358
UK	0.0000	0.0000	0.0000	0.0408	0.0000	0.9592
Philippines	0.4544	0.5456	0.0000	0.0000	0.0000	0.0000
Singapore	0.0000	0.0000	0.0000	1.0000	0.0000	0.0000
Malaysia	0.0000	0.0000	0.0000	0.0000	0.5162	0.4838
Others	0.5316	0.1689	0.2034	0.0000	0.0018	0.0943

weather conditions supported in increasing the production to meet the domestic as well as external demand (Varghese, 2011).

Growth analysis :

The Compound Growth Rates (CGRs) of area, production, productivity and exports of groundnuts for 11 years *i.e.* from 2000-01 to 2010-11 were estimated and presented in Table 5. It can be observed from the table that the growth rates of area (-0.87 %) is negative and non-significant where as production (1.23%) and productivity (2.12%) were positive but non-significant, while the growth rate of export quantity (15.25%) was positive and significant. As revealed in the earlier sections, over the years the exports have increased substantially was further confirmed by the growth rate analysis. For the overall period, the quantity of groundnut exports grew annually by 15.25 per cent, export value by 24.28 percent and unit value by 4.09 per cent.

Direction of Indian fresh groundnut exports :

The Transitional Probability Matrix presented in Table 3 provides a broad indication of changes in the direction of export of groundnut from India for the study period (2000-01 to 2010-11). The major Indian groundnut importing countries were Indonesia, Malaysia, UK, Philippines, Singapore, and all other importing countries were grouped under the category of the other countries. The transitional probability matrix was obtained for the study period by using the actual proportion of exports to different importing countries. This matrix explained the changing direction of G trade among groundnut importing countries which was necessary for taking the proper decision in view of their expected changes (Kumar *et al.*, 2007).

It is evident from Table 6, that Singapore was one of the

most stable markets among the major importers of groundnut as reflected by the probability of retention at 1.00 *i.e.*, the probability that Singapore retains its export share over the study period was 100 per cent. Thus, Singapore was the most reliable and loyal market for Indian groundnut. UK and Philippines had zero probability retention. Indonesia retained 71 per cent, Malaysia retained 51 per cent and other countries retained 9 per cent of the export. These results are in line with findings of author Mokashi (2012). This implied that Singapore was the most stable market; Indonesia and Malaysia were the moderately stable markets, where as UK and Philippines were the most instable markets. Similar findings were obtained by Cauvery (1991), Mitra and Jena (1991), Patil *et al.* (2009), Ramachandra *et al.* (2002) on the production and export of chillies.

SUMMARY :

Gujarat is the leading state in the country as its share in the total area was to the extent of 33.26 percent contributing 32.37 per cent of the nation's groundnut production and its has a strong impact on country's groundnut production as reflected in the year 2008-09. Growth rate of groundnut production and productivity is Positive, which is showing increasing trend of both production and productivity. This is because of use of high yielding hybrids in place of varieties, increase in average yield, favourable weather conditions and changing consumption pattern. The favourable weather conditions and change in economic environment are found to be the important factors in increasing the production to meet the domestic as well as external demand. European Union, Indonesia, Canada, Singapore, Malaysia and Philippines are the five largest net importers of groundnut. Singapore was the

most stable market; Indonesia and Malaysia were the moderately stable markets, where as UK and Phillipines were the most instable markets.

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